VIII.—*Description of a new Tailed Batrachian from Corea.* By G. A. Boulenger.

Hynobius Leechii, sp. n.

Palatine teeth forming a ⋀-shaped figure, which is broader than long; the length of one of the series, from anterior to posterior angle, equals one half of the width of the tongue. Head depressed, a little longer than broad; snout short, rounded. Body thrice and two thirds the length of the head; the distance from snout to gular fold contained nearly thrice in the distance from latter to cloaca. Limbs not meeting when adpressed; fifth toe well developed. Tail nearly as long as the distance between gular fold and vent, thick, compressed, not keeled, with vertical grooves, obtusely pointed posteriorly. Skin smooth; thirteen costal grooves; a vertebral groove. Blackish brown, above speckled with pale brownish; upper surface of tail pale brownish, with a few black dots.

	millim.
Total length	83
From snout to cloaca	47
Head	10
Width of head	8·5
Fore limb	12
Hind limb	14
Tail	36

A single specimen formed part of a small collection of Batrachians made at Gensan, Corea, and presented to the Natural-History Museum by J. H. Leech, Esq. The other species are: *Rana esculenta*, var. *japonica*, *Bufo vulgaris*, and *Hyla arborea*, var. *Savignyi*.

Finding that the name *Anaides*, given by Baird in 1849 to a genus of Plethodontine newts (*cf.* Cat. Batr. Caud. p. 52) is preoccupied (Westwood, 1841), I propose to change it to *Autodax*.

IX.—*On the Genus* Hindia, *Duncan, and the Name of its Typical Species.* By George Jennings Hinde, Ph.D., F.G.S.

Dr. Rauff's* able paper on this genus, a translation of which by Mr. W. S. Dallas appeared in the September number

* "Ueber die Gattung *Hindia*, Dunc.," Sitzungsb. der Niederrh. Gesell. zu Bonn, Sitzung vom 10. Mar. 1886.

of the 'Annals,' has served to clear up many of the doubtful points in the structure of this sponge, which had remained unexplained in the original description * by Prof. Duncan and in my own subsequent short notice † of it. I have recently again studied the characters of the fossil from new and better prepared microscopic sections, and, thanks to the generosity of Dr. Rauff, I have had the opportunity of examining the specimens and sections on which his descriptions were based, as well as the admirable drawings made from them for his forthcoming monograph. Before, however, commenting on Dr. Rauff's observations on the genus, I wish to reply to two objections brought against me by Prof. Duncan, in the September number of the 'Annals,' respecting my notice of *Hindia* in the 'Catalogue of Fossil Sponges in the British Museum,' p. 57.

The first point raised by Prof. Duncan is that I have replaced the name "*sphæroidalis*," given by him to the typical species in 1879, by the name "*fibrosa*," applied by Ferd. Rœmer ‡ to the same species in 1860. Prof. Duncan rightly states, "that a species in order to be established must be so described that other forms than the type can be recognized;" and he further alleges "that there is not a single sentence in the description [Rœmer's], meagre as it is, that would lead any one to distinguish the form I described from New Brunswick as belonging to it;" and "Ferd. Rœmer not having properly and practically described the form he studied, and having placed it among the corals, I [*i. e.* Duncan] do not consider his species of any value whatever."

If these statements of Prof. Duncan represented the whole truth of the matter he would be fully justified in placing the name "*fibrosa*" on one side, and insisting, as he does, that "*Hindia sphæroidalis* is quite correct." But after a careful examination of fossils like those named *Calamopora fibrosa*, Rœm., of which there are several examples in the British Museum, and comparing them with Rœmer's descriptions and figures, I can affirm "that they have been properly and practically described, so that other forms than the type can be recognized;" and though they have been erroneously referred to corals, yet the specific name is not thereby invalidated.

The explanation of this apparent strong contradiction is as follows:—It happens that the forms from Tennessee studied by Rœmer are in the condition of silicified casts, in which the

* Ann. & Mag. Nat. Hist. 1879, ser. 5, vol. iv. p. 84.

† 'Catalogue Fossil Sponges Brit. Mus.' p. 57.

‡ 'Die silurische Fauna d. westl. Tennessee,' p. 20, pls. 2, 2*a*, 2*b*.

original spicular structure of the sponge has almost entirely disappeared, and the radiating canals and interspaces between the spicules are infilled with solid silica. When thus preserved the fossil has a most deceptive resemblance to a minute Favositoid coral which has been silicified, and it is therefore no matter for surprise that even so experienced a palæontologist as Ferd. Rœmer *, who had not seen the form in any other state of preservation, should have regarded it as a coral with minutely perforated walls. His description of the characters of the specimens is clear and explicit, and the accompanying figures accurately represent its external form and internal structure, so that even small fragments of the fossil could be recognized from them. It is not Rœmer's fault if his faithful description of the forms which he named "*fibrosa*" does not correspond with that given later by Duncan of the same fossil in a different state of preservation. A mere cursory glance at Rœmer's figures would lead one to suspect the identity of the silicified forms from Tennessee with the calcified ones from New Brunswick described by Duncan. This identity can be readily demonstrated by placing a specimen from this latter locality in dilute acid, when, by the removal of the spicular structure, it presents the same appearance as the Tennessee examples. In one specimen in my possession the same result has been effected by natural means, so that in one part of it the structures described by Rœmer as "*fibrosa*" are clearly shown, and in another part those which Duncan placed under the specific name "*sphæroidalis*."

Under these circumstances I submit that Rœmer's clear description and figures of these silicified fossils justly entitle his specific name "*fibrosa*" to be retained for them, and that the error he made in placing them as corals does not, according to the recognized rules of scientific nomenclature, warrant its rejection in favour of the subsequent designation of Prof. Duncan. If such a substitution were allowed there would be

* Ferd. Rœmer does not stand alone in making this mistake. The description of this same fossil was the first attempt I myself made at palæontological work, and in complete ignorance that it had been previously noticed by Rœmer I also put it down as a coral! I had the less excuse for the error since my specimens were not silicified. Fortunately the Geological Society, to whom my paper and specimens were sent, only published the former in abstract. The mistake I made taught me to use the microscope and greater caution in future work. It is still more remarkable that even after both I and Ferd. Rœmer had, independently of each other, publicly acknowledged that our supposed coral was a true sponge, Dr. Steinmann, a palæontologist of some pretensions, should boldly declare that the same fossil had not a single characteristic feature of a sponge, and that it ought to be relegated to the same genus of *Favosite*-corals in which Rœmer had originally placed it.

constant shifting of specific names and corresponding confusion. It may be mentioned that the course I have adopted in retaining Rœmer's specific name has also been followed by Dr. Rauff—an independent critic.

Prof. Duncan does not seem to be aware that even if he substantiated his claim to the name he proposed as against that of Rœmer, there is yet another bar to its adoption, since the same species in the interval between Rœmer's and Duncan's work was described by Prof. Hall *, of Albany, under the title of "*Astylospongia inornata*." The description in this case is indeed very meagre, and, as no figures are given, it might fairly be alleged that it is insufficient for the recognition of the species. That, however, the *A. inornata*, Hall, is the same as *Hindia fibrosa*, Rœmer, I am fairly confident, as I have myself collected from the same strata, in the localities mentioned by Hall, the fossils answering to his descriptions, and they are identical with Rœmer's forms.

The second point raised against me by Prof. Duncan relates to the original mineral nature of the sponges of this genus *Hindia*, which are asserted, in his first description of the form in 1879, to have been calcareous, whilst I have placed them as siliceous in the Cat. Foss. Sponges. Prof. Duncan, in the September number of the 'Annals,' after full consideration of the arguments brought forward by myself and Dr. Rauff for their siliceous nature, again states his belief in their original calcareous constitution, and says that I omitted to notice one of the main arguments in favour of this theory, viz. "the discovery of a penetrating, parasitic, unicellular, vegetable organism within the canals and traversing the spicules"†. The omission on my part was not from a consciousness of the asserted fact having any important bearing on the argument, but simply because I felt that it was founded on errors of observation which, to spare Prof. Duncan, it would be preferable to pass over in silence.

Two reasons were brought forward by Prof. Duncan in 1879‡ for the original calcareous nature of *Hindia*: one, that the carbonate of lime, of which the spicular structure of the New Brunswick specimens now consists, was not in distinct crystals, but resembled that of fossils which were originally of this mineral; the other, that "in the midst of the long canals, in their interspaces, and passing over the

* "Note on the Occurrence of *Astylospongia* in the Lower Helderberg Rocks," '16th Annual Report of the State Cabinet of Natural History,' 1863, p. 69.

† 'Annals,' 1886, vol. xviii. p. 228.

‡ 'Annals,' vol. iv. p. 90.

skeletal parts, in close proximity, are many relics of a large form of *Palæachlya** *penetrans*, Duncan, and in sections the passage of the tubes of the parasite through and along the inside of the spicules can be seen." These tubes are said to be crammed with large spores, and both tubes and spores are carbonized. The parasite is further stated to "have grown at the expense of the organic matter of the spicules during the lifetime of the organism" (*i. e.* the sponge), and from the knowledge of the physiology of the *Achlya*-group it is not probable that they could penetrate and live in silica (*l. c.* p. 90). In the September number of the 'Annals' (seven years later) Prof. Duncan repeats his statements respecting this asserted parasite, and still maintains that it "grew and lived in the sponge as it did in the corals of the same age, and was not introduced after fossilization" (*l. c.* p. 228).

Considering now the character of this asserted parasite, *Palæachlya perforans*, Dunc., which forms such an important argument, in Prof. Duncan's estimation, for the original calcareous nature of the sponge *Hindia*, the first point I wish to notice is that, according to the author's own statement, it is not probable that it could penetrate and live in silica. In this case it is difficult to account for its presence in the long canals and the interspaces in the examples of *Hindia* from New Brunswick, in which Prof. Duncan noticed it, since these spaces *are* filled with silica in the form of chalcedony and quartz. This siliceous matrix is interpenetrated with the so-called *Palæachlya*, which Duncan asserts could not bore into such mineral structures. Respecting the nature of the mineral which fills up the canals and interspaces in the New Brunswick specimens, Prof. Duncan has stated †: "The fossils are infiltrated with clear transparent or rather dusky calcite, with very few cleavage-planes, and in some places giving indications, under polarized light, of a more or less acicular or fibrous structure, like aragonite. Rhombs of calcspar exist here and there; and the intensity of the colours elsewhere, under the crossed Nicols, varies much." Again, on p. 90: "It does not appear to me to be likely that these parasitical plants penetrated after the *calcareous* ‡ fossilization of the interstices was completed." The materials thus described with such minuteness of detail, as calcite and aragonite, are

* The name originally given by Prof. Duncan to the form here referred to is *Palæachlya perforans* (Quart. Journ. Geol. Soc. 1876, vol. xxxii. p. 210), and it is evident that he has here mistakenly used the term "*penetrans*." I propose to revert to the original name.

† 'Annals,' 1879, vol. iv. p. 86.

‡ The *italics* are my own.

in reality, as already mentioned, chalcedony and quartz. This I have proved by testing with acid and by polarized light some of the same specimens from New Brunswick which Prof. Duncan examined, and he has therefore palpably made a very serious error of observation, owing to which his important argument for the original calcareous nature of *Hindia* at once collapses; for as he states* that the *Palæachlya perforans* only inhabits calcareous structures, then the tubes or threads in this siliceous material cannot be due to this organism.

But Prof. Duncan further states that the *Palæachlya* has perforated the calcareous spicules of *Hindia* as well as bored through the infilling matrix, which, as we have just shown, is siliceous. If this were the case it would indicate a marvellous capacity of penetration in this lowly organism, to be able to make its way directly through both calcite and silica indiscriminately. But in this matter also there seems to be another error of observation on Prof. Duncan's part, to which Dr. Rauff first called my attention. After careful examination of the so-called tubes or borings of *Palæachlya* in New Brunswick specimens, Dr. Rauff failed to find a single instance in which they passed through the spicules of the sponge. They can be seen in microscopic sections to pass over and under them in close proximity, but not through them. My own observations confirm those of Dr. Rauff. It would thus appear that the action of the supposed *Palæachlya perforans* in the New Brunswick specimens of *Hindia* has been the reverse of what, according to Prof. Duncan, it should have been; for instead of penetrating calcareous structures exclusively, and eschewing the siliceous, it has left the calcareous spicules of the sponge intact, and bored only into the siliceous matrix!

There is, however, yet another point respecting this *Palæachlya perforans* which requires explanation. Prof. Duncan asserts that it carried on its borings "during the lifetime of the organism," *i. e.* the sponge; but in this case the canals during the lifetime of the sponge were mere open tubes, and

* Though Prof. Duncan reasserts in September 1886 what he stated in 1879, that no long tubular vegetable structures with organs of reproduction (i. e. *Palæachlya perforans*) have ever been found ramifying in *siliceous* skeletons, yet in 1881, in a paper "On some remarkable Enlargements of the Axial Canals of Sponge-spicules and their Causes," published in the Journ. Microsc. Soc., he writes that he agrees with Mr. Carter that the perforations in the *siliceous* spicules of recent sponges are produced by somewhat similar organisms to *Palæachlya perforans* (p. 568), and he also finds zoospores in these perforated siliceous spicules singularly resembling those of *Achlya perforans*.

the interspaces between the spicular meshwork would have been occupied by the soft living structures of the sponge. How could the borings therefore have been preserved if they were made in the fleshy portion of the sponge, or in the canals, when there are no traces of the soft structures themselves now remaining, and both the spaces formerly occupied by these structures and the canals have since been infilled with solid silica? Only on the supposition that the *Palæachlya* formed its own tubes of sufficiently hard materials to resist all the subsequent changes of fossilization can these dark threads in the siliceous matrix of *Hindia* be ascribed to this unicellular vegetable parasite, and Prof. Duncan * does not attribute to it this capacity.

From the above considerations it seems to me evident that whatever may be the nature of these tubes and dark filaments in the siliceous matrix of the New Brunswick specimens of *Hindia*, they do not correspond to the characters of the boring parasite, *Palæachlya perforans*, Dunc., and therefore they have no bearing whatever on the question of the original mineral nature of the sponge. Some of these supposed borings appear to me to be in reality the infilled axial canals of siliceous acerate or acuate spicules, which have found their way into the canals of the sponge. The faint outlines of the walls of these spicules can in some cases be clearly distinguished; but whether they are proper to the sponge or have merely found their way into its canals from the exterior I am not prepared to determine. I have noticed similar spicules cemented to the outer surface of Tennessee examples of *Hindia*, and I have also obtained them isolated by placing specimens in acid. Spicules of this character not unfrequently in the course of fossilization get their axial canals infilled with dark solid materials, which remain as rods or threads even after the spicular walls have been dissolved; and I believe some of the structures in the matrix of *Hindia* are of this nature. The dark granules, which are either scattered in the matrix or variously grouped to form the rods or threads, are regarded by Prof. Duncan as the carbonized oospores of the *Palæachlya*; but by employing high powers many of these granules can be seen to possess angular faces, and it has been suggested to me by Dr. Rauff that they are in reality small crystals of iron pyrites.

* Prof. Duncan has stated, however, in Quart. Journ. Geol. Soc. 1876, vol. xxxii. p. 206, that he has observed the *fossilized cellulose* wall of this very species of *Palæachlya* in the hard parts of a fossil *Thamnastræa*; but it would be far more wonderful to find its tubes and their contents preserved after they had penetrated the *soft* parts and the *empty canals* of this Silurian sponge.

The other reason alleged by Prof. Duncan for his belief in the original calcareous nature of *Hindia* is that the calcite of which the spicular structure of the New Brunswick examples at present consists is not in distinct crystals, and cleavage-planes are rare, and the mineralization resembles that of fossils which were originally of carbonate of lime. But though this calcite is not in crystals, a very slight amount of observation will show that it cannot be regarded as the original mineral of the sponge-skeleton, since it is filled with foreign dark grains and other particles of a similar nature to those present in the matrix of the rock in which the sponge has been imbedded. Its character shows that it has been derived from the finer sediments of the surrounding rock, which have found their way into the empty moulds left by the dissolution and removal of the original siliceous spicules. In fact, if we suppose the minute cavities in the silicified Tennessee examples to be filled with fine calcareous sediment, we should have structures produced like those of the New Brunswick specimens. Under some conditions, instead of this dusky non-crystalline material a true crystalline calcite has filled up the cavities, as in the case of specimens from Schoharie.

The various mineral conditions under which *Hindia* occurs are only such as may be found in fossil sponges which even Prof. Duncan would not hesitate to accept as of siliceous origin, such as, for example, the contemporary genera *Astylospongia* and *Aulocopium*. In these sponges, as well as in *Hindia*, the original spicular structure may be either as empty casts in a siliceous or calcareous matrix, or the casts may be infilled either with granular sedimentary calcite or with crystalline calcite, or with iron pyrites and peroxide of iron.

But I have lately succeeded in obtaining further evidence of the originally siliceous nature of *Hindia* by the discovery of a portion of a specimen in which the spicules are actually siliceous, and by the action of acid they can be isolated from the matrix and obtained separately. In this condition their surfaces are pitted and the expanded ends of the rays eroded in precisely the same manner as the siliceous spicules of many Cretaceous sponges.

Possibly it may be urged that these siliceous spicules are merely replacements of calcite by silica; but, on the other hand, in their form and character, and in their mode of union with each other to form the skeleton, they so distinctly resemble the siliceous spicules of both recent and fossil lithistid sponges, that the conclusion is inevitable that they must belong to the same group.

This resemblance is so palpable that even Prof. Duncan originally described *Hindia* as a lithistid sponge. But as the name lithistid was applied by Oscar Schmidt only to sponges with siliceous skeletons, it is therefore a decided misnomer thus to term *Hindia*, when it is regarded by Duncan as a calcareous sponge. If it is really a calcisponge it should stand alone as the only extinct representative of a distinct order in that group, since there is no other known calcisponge with spicules or a spicular structure at all resembling those of *Hindia*.

Prof. Duncan finally pleads, in the September number, that the former existence of a mimetic series of calcareous sponges is within reasonable distance of the truth, for who amongst us is to limit Nature as regards possibilities? (p. 228). But in determining the character of this fossil sponge, regard should first be taken for the *facts* of Nature, and if, according to all analogies, these point to the siliceous origin of *Hindia*, it is altogether beside the point to suggest the *possibilities* of Nature to produce a mimetic series of calcareous sponges, or to surmise that the group may have become extinct or merged into a higher form, as the parent of *Zoantharia perforata*. When such rash speculations depend mainly on the supposed fossilized filaments of an alga *, it is not surprising if they prove to be far from within reasonable distance of the truth.

I am able to confirm the careful descriptions of *Hindia* given in Dr. Rauff's paper in nearly every respect. The microscopic sections studied by this author showed more clearly the junction of the spicules than those at my disposal, and he has established the observation of Duncan that there are not more than four rays in the elementary spicule, whereas I thought it probable that the number might have varied from four to six †. He has also shown that the union of the spicules does not take place by the junction of the frilled ends of their rays with each other, as stated by Duncan and accepted by myself, and he explains Duncan's figures ('Annals,' 1879, vol. iv. pl. ix. figs. 1 *a*, 2, 2) by supposing that they have been drawn from a transverse section of the

* Prof. Duncan's statements respecting this fossil alga, *Palæachlya perforans*, require for their acceptance an unlimited faith in the possibilities of Nature. Not only does it exist in these Silurian sponges, but it has bored cavities in the scales of Cretaceous fishes, in the hard parts of both fossil and recent corals and shells, and, *mirabile dictu*, the same species still exists, and works its ravages on the bodies of our common house-flies—this is the aerial form of the *Achlya*! Who would have imagined a direct genetic connexion between the parasite of a Silurian marine sponge and that of a house-fly, dead on the wall?

† Cat. Foss. Sponges Brit. Mus. p. 57.

sponge, in which the real union of the spicules cannot be distinguished.

Having obtained some of the spicules of *Hindia* in a silicified condition and isolated from each other and from the

Fig. 1.

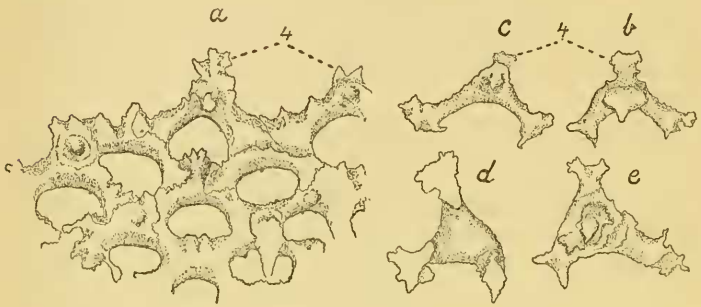

Fig. 2.

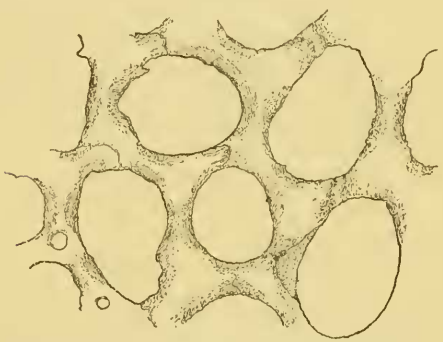

Fig. 1.—*a*, a fragment of the skeleton of *Hindia fibrosa*, Rœm., sp., showing in places the junction of the spicular rays; drawn from a longitudinal section of a specimen from New Brunswick. 4, the fourth or truncated ray of the spicules. *b*, *c*, two isolated siliceous spicules, viewed laterally. *d*, another spicule seen from below, showing the central node and the expanded ends of the rays. *e*, another spicule seen from above, showing the end of the fourth ray. Drawn under the camera lucida to the scale of 70 diameters.

Fig. 2.—Portion of a tangential section of *Hindia fibrosa*, showing the apertures of the radial canals. The individual spicules cannot be distinguished. Drawn to the same scale as fig. 1.

matrix, I am enabled to give further particulars respecting their form than could be obtained from studying them in the microscopic sections. In all the detached examples, which might be deemed complete, four arms or rays are present,

extending from a common inflated centre. Three of the rays are either straight or slightly curved, subequal, cylindrical in section and with expanded extremities; they form by their union, as Duncan has already stated, a tripod-shaped body from the upper surface of which the fourth ray projects. This fourth ray is always considerably shorter than the others, and in most cases is merely a short stumpy process, terminating in from two to four small, conical, slightly divergent spurs. In the silicified specimens (fig. 1, *b–e*) the frilled convex borders and extremities of the tripodal rays are considerably eroded, and the spurs of the fourth ray are only faintly indicated (*b*, 4); but they can be distinguished in the connected meshwork slightly projecting into the interspaces, even when the ray itself is concealed (fig. 1, *a*). The inflated nodes or centres of the spicules cannot be made out in a longitudinal section of the sponge (fig. 1, *a*), and even in a tangential section, owing to the manner in which the rays overlap each other, this character is masked (fig. 2); but in the detached spicules the centres are clearly shown (fig. 1, *d*, *e*).

The connected structure of the skeleton can be readily understood when once the true form of the individual spicules has been ascertained. In all cases the fourth or truncated ray points to the exterior of the sponge. The three diverging tripodal rays of each spicule extend towards the central nodes of three different proximate spicules next below, and their expanded terminations are intimately apposed to the centres and convex borders of the rays of these spicules. But as each spicule is connected by three rays with three different spicules of the proximate series below, so also does each support, on the upper portion of its node, three rays of different spicules which converge to it from the series above. The ends of these three converging rays are thus grouped round the truncated fourth ray of the spicule in such a manner that, when viewed in a longitudinal section, it is almost entirely hidden by them, and only its summit-spurs can be seen (fig. 1, *a*). The fourth ray thus serves as a centre and support for the rays converging to the spicule from above, and thus materially contributes to the firmness and strength of the skeleton.

Owing to the inflation of the central nodes of the spicules, the canals radiating from the central space to the surface of the sponge are subcircular or subelliptical in transverse section (fig. 2), the spicular nodes occupying the position of the angles shown in Dr. Rauff's diagrammatical figure *. The individual spicules and their union can hardly be distinguished in the tangential section (fig. 2), although drawn on the same

* 'Annals,' Sept. no., fig. 2, p. 174.

scale as the longitudinal section. In the silicified examples from Tennessee the casts of the spicules on the outer surface of the sponge are shown as Δ-shaped depressions, with minute circular holes at each of the angles, indicating the centres and rays respectively.

Considerable differences of opinion have been expressed as to the systematic position of *Hindia*. Dr. Rauff regards it as belonging to the Tetracladine family of lithistids; Zittel places it with the Megamorina; whilst I have ranged it under the Anomocladina. Dr. Rauff maintains that the number of the rays (when four are developed) and the angles at which they are given off from the centres correspond with those of Tetracladine spicules. On the other hand, the general characters of the elementary spicules and their mode of union with each other appear to me to indicate a closer relationship to typical Anomocladine sponges. The spicule fundamentally consists of a central node giving off simple rays with expanded terminations, which clasp the centres and convex surfaces of other spicules. In these features *Hindia* resembles such recognized Anomocladine genera as the Silurian *Astylospongia*, F. Rœmer, the Jurassic *Cylindrophyma*, Zitt., and the recent *Vetulina*, O. Sdt. In typical Tetracladine sponges, on the other hand, the four rays of the spicules radiate from a non-inflated centre; they usually branch near their extremities, and they join together by the interlocking of the branched ends with each other, thus materially differing from *Hindia*. It is true that the number of the rays is the same in *Hindia* as in Tetracladine sponges; but then one ray is only incipiently developed, and the resemblance in this respect appears to me to be more than counterbalanced by the material differences in others.

In the general regular construction of its skeleton, *Hindia* finds a close parallel in *Astylospongia* and *Cylindrophyma*; and in the particular feature of the disposition of the spicules, so that they form a series of arches, with the convexity towards the exterior, and the nodal summit of each arch supporting the bases of the arches next above, there is a close resemblance to the existing genus *Vetulina*, in which Sollas * has described a precisely similar arrangement. In no other family of lithistids is there, to my knowledge, the same regular construction of the skeleton as in *Hindia* and the other Anomocladine genera above mentioned, and I think therefore its true position is in this family in near proximity to the contemporary genus *Astylospongia*.

Some recent discoveries show that *Hindia* had a very wide

* "On *Vetulina stalactites*, O. Sdt., and the Skeleton of the Anomocladina," Proc. Roy. Irish Acad. 2nd ser. vol. iv. no. 4, p. 491.

distribution in Palæozoic strata. Prof. H. Alleyne Nicholson has sent me an imperfect calcified specimen from rocks of Ordovician age at Craighead, Girvan, Ayrshire; and from the Silurian at Wänge, Isle of Gotland, Prof. G. Lindström has forwarded me silicified casts. It also occurs in fragments of limestone of Trenton age (Ordovician) in Northern Illinois, which have been sent to me by Dr. W. R. Head, of Chicago. Some detached tripodal spicules discovered by Mr. J. Wright, F.G.S., of Belfast, in Carboniferous limestones at Sligo, and described and figured by Mr. H. J. Carter *, also appear to me to belong to a sponge of this genus. Its occurrence in Tennessee, New Brunswick, New York, St. Petersburg, and in the Drift of Northern Germany has already been recorded.

MISCELLANEOUS.

Description of a new Genus of Gymnosomatous Pteropoda. By M. Paul Pelseneer.

The author discusses the described genera of Gymnosomatous Pteropoda, of which he rejects *Ægle*, Oken, and *Cirrifer*, Pfeffer, as synonymous with *Pneumoderma*, Cuv.; while *Cliodita*, Q. & G. = *Clione*, Pall., *Eurybia*, Rang = *Halopsyche*, Bronn, *Pneumodermopsis*, Bronn = *Dexiobranchæa*, Boas, and *Trichocyclus*, Eschsch., and *Trigonius*, Busch, are founded upon larval forms. *Pelagia*, Q. & G., and *Cymodocea*, d'Orb., are provisionally rejected as insufficiently characterized. Six genera are accepted by the author, as tabulated below:—

1. Visceral envelope presenting a specialized branchial apparatus ..... 2.
   Visceral envelope presenting no special branchial apparatus ..... 5.
2. Acetabuliferous buccal appendages ..... 3.
   No acetabuliferous buccal appendages .... 4. *Clionopsis*, Trosch.
3. No posterior branchia ..... 1. *Dexiobranchæa*, Boas.
   A posterior branchia ..... 4.
4. Posterior branchia presenting four symmetrical rays ..... 2. *Pneumoderma* †, Cuv.
   Posterior branchia consisting of a membranous ring ..... 3. *Spongiobranchæa*, d'Orb.
5. Body elongated, pointed behind ..... 5. *Clione*, Pall.
   Body ovoid, rounded behind ..... 6. *Halopsyche*, Bronn.

These genera are ranged under four families, namely:—1. Pneumodermatidæ (genera 1–3); 2. Clionidæ (genus *Clione*); 3. Halopsychidæ (genus *Halopsyche*); and 4. Clionopsidæ (for *Clionopsis*).

* 'Annals,' ser. 5, vol. vi. p. 212, pl. xiv. figs. 10, 11.

† Throughout his paper the author has altered Cuvier's name to *Pneumonoderma*, a change which is manifestly incorrect. Cuvier's name conveys the idea that the animal breathes by its skin; the alteration would give it "skin-lungs" or a "lung-skin"!